



The Book of Gem Cuts

Second Edition



INTRODUCTION

HERE, for the first time, is information that the beginner in facet cutting needs; how and where to begin, what angles to use, what index settings to use, what abrasive, what polishing agent, what type of equipment - all given in simple, step-by-step form with illustrations and explanations of how to prevent mistakes and how to correct them if they occur.

For generations, facet cutting has been a closely guarded Guild secret. Only recently has any information been available to the would-be cutter, and this has been in optical determinations which are invaluable to the advanced cutter, but they do not help you get started.

The theories of light refraction, critical angle, and optical properties have been left for the future, since it is felt that in most cases an attempt to master these principles at this time is confusing to the beginner, rather than helpful. For the same reason, the angles given have been for QUARTZ gems in each case. Rock crystal, Amethyst, and Citrine are comparatively inexpensive, attractive and colorful, and they present fewer cutting problems for the beginner. You will notice that in several instances, ranges of angles are given for you to make a choice, however, only one angle is given for the main facets. Main facets must be cut at the given angles. Because you will find that the size of the stone, size of the table, and proportions used may not produce the desired shape of a particular pattern, a range of angles is provided for auxiliary facets.

Once the technique of producing the given cut has been mastered, you are ready to attempt other materials, and by reference to the chart you will be able to determine the proper angles to use for the main facets on other gem materials.

We take great pleasure in presenting Volume 1 of *The Book of Gem Cuts*



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The home of Master faceting instruments

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ADJUSTING MAIN ANGLES

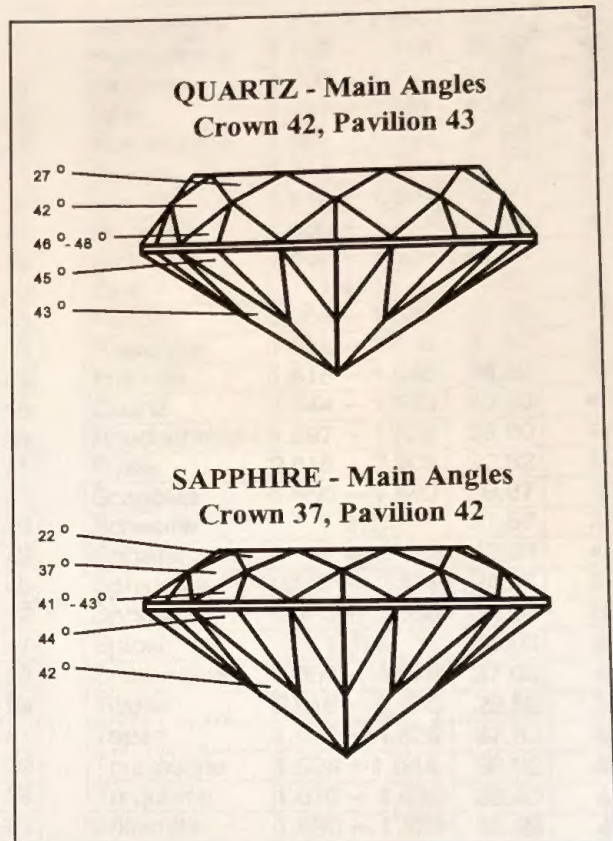
In order to bring out the greatest brilliance in any gem stone the angles of the main facets must be cut at a definite inclination to the plane of the table. The angle of inclination is determined by the refractive index of the gem material.

The cuts in this book are based on the angles used in faceting quartz and must be adjusted if cutting other materials.

For most cuts there are three rules that make adjusting angles a simple matter:

- (1) For the crown, the difference between the main facets and the table (or star facets) is 15 degrees;
- (2) The angle of the crown girdle facets will usually be 4 to 6 degrees lower than the main facets, providing the crown is the proper height.
- (3) For the pavilion, the girdle facets are usually brought $\frac{2}{3}$ of the way down toward the culet, sometimes more, and will have a difference of 2 degrees between the pavilion girdle facets and the pavilion main facets.

For some cuts, where you find sets of facets that do not come under the category of the main, girdle or table facets, adjusted the angles by taking the difference between the main angles for quartz and those for the material at hand, and applying this amount to all sets of facets (refer to chart). In this way you will keep the basic relationships between the facets. They will all "point up" properly, despite changes in the main angles. The resulting gem will either be deeper or shallower than the diagram shown for a quartz gem.



PHYSICAL PROPERTIES

MINERAL/ROCK	REFRACTIVE INDEX	CRITICAL ANGLE	MAIN ANGLES CROWN PAVILION	
Actinolite	1.610 - 1.640	38.40	43	39
Anatase	2.493 - 2.554	23.65	35	41
Andalusite	1.627 - 1.648	37.92	43	39
Apatite	1.632 - 1.646	37.75	43	39
Apophyllite	1.535 - 1.537	40.65	42	43
Augelite	1.570 - 1.590	39.52	42	43
Axinite	1.678 - 1.688	36.53	43	39
Azurite	1.720 - 1.830	35.55	37	42
Barite	1.636	37.68	43	39
Benitoite	1.757 - 1.804	34.70	37	42
Beryl	1.575 - 1.583	39.22	42	43
Beryllionite	1.552 - 1.562	40.12	42	43
Brazilianite	1.598 - 1.617	38.73	42	43
Calcite	1.486 - 1.658	42.25	42	45
Cancrinite	1.496 - 1.524	41.98	42	43
Carborundum	2.650 - 2.700	22.17	34	41
Cassiterite	1.997 - 2.093	30.05	35	41
Celestite	1.622 - 1.631	38.05	43	39
Chrysoberyl	1.746 - 1.755	34.93	37	42
Crysocolla	1.460 - 1.570	43.23	41	45
Corundum	1.760 - 1.770	34.62	37	42
Crocoite	2.310 - 2.660	25.65	35	41
Dunburite	1.630 - 1.636	37.83	43	39
Datolite	1.625 - 1.669	37.97	43	39
Diamond	2.419	24.42	35	41
Diopside	1.671 - 1.726	36.77	43	39
Diopase	1.644 - 1.709	37.47	43	39
Enstatite	1.658 - 1.670	37.30	43	39
Epidote	1.729 - 1.768	35.33	37	42
Euclase	1.654 - 1.673	37.30	43	39
Feldspars	1.518 - 1.588	41.2-	42	43
		40.18		
Fluorite	1.434	44.22	41	45
Garnets:				
Almandite	1.800	33.75	37	42
Andradite	1.890	31.95	37	42
Grossularite	1.735	35.08	37	42
Pyrope	1.746	34.93	37	42
Rhodolite	1.760	34.62	37	42
Spessarite	1.800	33.75	37	42
Uvarovite	1.830 - 1.870	33.12	37	42

MINERAL/ROCK	REFRACTIVE INDEX	CRITICAL ANGLE	MAIN ANGLES CROWN PAVILION	
Hambergite	1.550 - 1.630	40.17	42	43
Hypersthene	1.703 - 1.716	36.02	43	39
Idocrase	1.700 - 1.720	36.03	43	39
Iolite	1.534 - 1.551	40.68	42	43
Kornerupine	1.665 - 1.682	36.92	43	39
Kyanite	1.712 - 1.731	35.73	37	42
Lazulite	1.610 - 1.640	38.40	43	39
Malachite	1.660 - 1.910	37.03	43	39
Moldavite	1.480 - 1.520	42.50	42	43
Opal	1.450	43.60	41	45
Peridot	1.654 - 1.690	37.30	43	39
Phenakite	1.654 - 1.670	37.30	43	39
Prehnite	1.615 - 1.645	38.25	43	39
Quartz	1.544 - 1.553	40.33	42	43
Rhodochrosite	1.597 - 1.826	38.80	42	43
Rutile	2.616 - 2.903	22.52	34	41
Scapolite	1.560 - 1.580	39.87	42	43
Scheelite	1.910	31.57	35	41
Sodalite	1.485	42.33	42	43
Sphalerite	2.368 - 2.371	24.97	35	41
Sphene	1.885 - 2.050	32.03	35	41
Spinel	1.718	35.60	37	42
Spodumene	1.660 - 1.676	37.03	43	39
Titania	2.616 - 2.903	22.52	34	41
Topaz	1.630 - 1.638	37.83	43	39
Tourmaline	1.624 - 1.644	38.02	43	39
Turquoise	1.610 - 1.650	38.40	43	39
Willemite	1.690 - 1.720	36.28	43	39
Zincite	2.013 - 2.029	29.78	35	41
Zircon ("a")	1.925 - 1.991	31.38	35	41
Zircon ("b")	1.925 - 1.991	31.38	37	42
Zircon ("g")	1.810 - 1.840	33.53	37	42
Zoisite	1.700 - 1.706	36.03	43	39

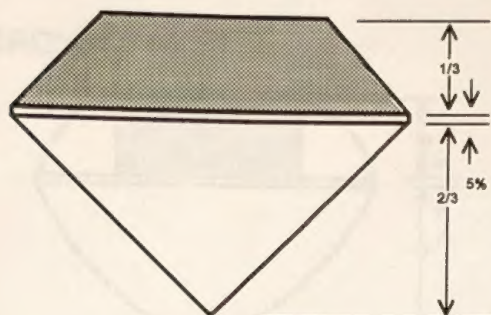
Critical angles are computed from the lowest refractive index values.

POLISHING RECOMMENDATIONS

MINERAL/ROCK	HARDNESS	REFRACTIVE INDEX	MAIN ANGLES		Tin Lap	Zinc Alloy Lap	Lead/Type Lap	Lucite Lap
			CROWN	PAVILION				
ANDALUSITE	7 to 7-1/2	1.627 to 1.648	43	39	Tin Oxide	Diamond 14,000 - 50,000		
APATITE	5	1.632 to 1.646	43	39	Tin Oxide		Linde 'A'	
BENITOITE	6-1/2	1.757 to 1.804	37	42	Tin Oxide			
BERYL	7-1/2 to 8	1.575 to 1.583	42	43	Tin Oxide or Cerium Oxide	Diamond 14,000	Tin Oxide or Linde 'A'	Cerium Oxide
CORUNDUM	9	2.650 to 2.700	37	42	Diamond 14,000 - 50,000 (with kerosene)	Diamond 14,000	Chrome Oxide	Diamond 14,000 - 50,000 (with kerosene)
EPIDOTE	6 to 7	1.729 to 1.768	37	42	Tin Oxide			
GARNET	6-1/2 to 7-1/2	1.735 to 1.830	37	42	Tin Oxide or Ruby Dix	Diamond 14,000 - 50,000	Linde 'A'	
OLIVINE	6-1/2 to 7	1.654 to 1.690	43	39	Tin Oxide	Diamond 14,000 - 50,000		
QUARTZ	7	1.544 to 1.553	42	43	Tin Oxide or Cerium Oxide	Diamond 14,000		Cerium Oxide
RUTILE	6-1/2 to 7	2.616 to 2.903	34	41	Linde 'A'	Diamond 14,000 - 50,000	Linde 'A'	
SPINEL	8	1.885 to 2.050	37	42	Linde 'A' or Ruby Dix	Diamond 14,000	E-111 Linde 'A' Chrome Oxide	
SPODUMENE	6 to 7	1.660 to 1.676	43	39		Diamond 14,000 - 50,000		
TOPAZ	8	1.630 to 1.638	43	39		Diamond 14,000 - 50,000		Linde 'A' or Cerium Oxide
TOURMALINE	7 to 7-1/2	1.624 to 1.644	43	39	Linde 'A' or Ruby Dix	Diamond 14,000 - 50,000	Tin Oxide or Linde 'A'	
ZIRCON ("g")	7-1/2	1.810 to 1.840	43	39	Damascus Ruby Dix	Diamond 14,000 - 50,000		

STANDARD BRILLIANT PREFORM

SIDE VIEW

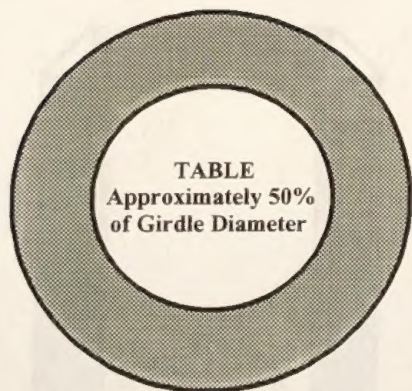


Grind rough stone into a cylinder. Eliminate any flaws that grinding crown or pavilion facets will not remove.

If cutting to a given size, leave stone at least 10% larger than required size.

Grind table flat and as near as possible to 90° of cylinder sides.

CROWN



Set protractor to 48° grind crown, leaving table approximately 50% of girdle diameter.

Set protractor to 47° and grind pavilion, leaving a wide girdle at least 5% of total height of stone.

CAUTION: Use ample supply of water on grinding wheel to avoid over-heating.

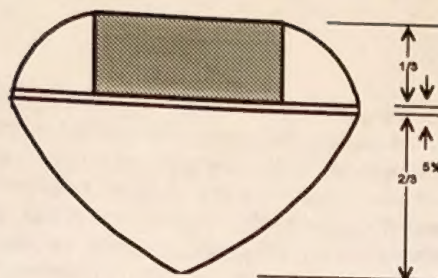
PREFORMING can be done on a silicon carbide wheel, such as used for cabochons, but the wheel must run true and smooth to eliminate chipping and fracturing.

Preforming can also be done on a faceting machine, although it is a little messy. Use a coarse grit diamond lap such as a 250 grit, or "ripple lap" to shape the stone. First dop the stone and place in the stylus (dop arm), disengaging the index gear. Grind the pavilion first, then grind the girdle. Transfer the stone to new dop. Place in stylus and grind crown to the proper angle. Remove stone from stylus and insert 45° dop holder in stylus. Place stone in 45° dop holder and grind table to required size.

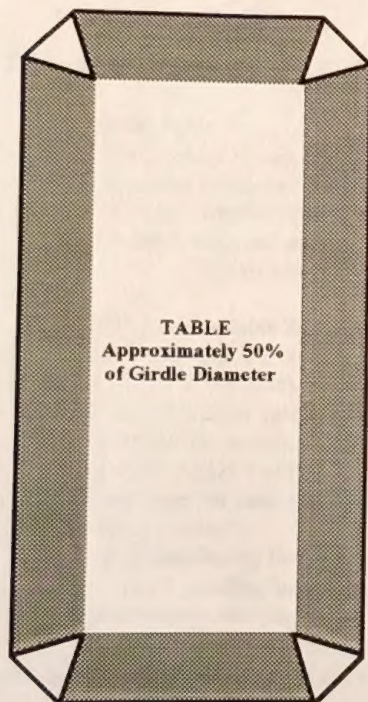
Preforming can also be done on a high speed diamond lap by hand, or with a mechanical preforming head.

EMERALD CUT PREFORM

CROWN



SIDE VIEW



GRIND TABLE FIRST, orienting the stone for color. Have the best color in "culet" area to show the most uniform color when stone is viewed through the table.

GRIND CROWN on a curve from the table to the girdle. Table is approximately 50% of the width of the girdle on the narrow dimension of the stone. Length of the traditional "Emerald Cut" is twice the width.

NOTE: Curve is ground on a wheel with a rolling action. Do not grind the crown with flat planes as the stone will be out of proportion when the facets are ground.

GRIND PAVILION in the same manner as the crown, leaving a fairly wide girdle. Check the pavilion with a protractor so that it is not ground below the critical angle. (See chart for critical angles.)

CORNER FACETS can be ground on the grinding wheel if extreme care is used not to over-cut. If preferred, they may be added in the normal faceting sequence.

WHAT GETS CUT FIRST ?

Where you begin cutting is dependent on what method or technique you follow. There is no right or wrong way, there are only preferences. Whatever works best for you . . . use it.

Follow a procedure that is easiest for you.
Use the technique that makes the gemstone look the way you want.

Diagrams in **The Book of Gem Cuts** are tabulations of angular relations, not procedures. In previous editions, narratives were placed opposite the corresponding diagram. For example, the instructions for cutting crowns were placed opposite the diagrams for crowns. Unfortunately, this was frequently taken by some readers to indicate that the crown was to be cut first, as the crown always appears at the top of a page. But, this is not the case. The diagrams follow the conventions of orthographic projection, meaning that top, side and bottom views appear at a prescribed position on the page. Where you begin cutting is a matter of preference. You can begin at the pavilion, table, girdle or crown. In all but a few instances, it won't affect the outcome. *(In those instances where the order of faceting has an influence on the outcome, comments have been included.)*

The authors' preferences are as follows:

Grind Table
Grind Girdle (faceted row)
Grind and polish pavilion
Grind and polish crown
Re-grind table and polish
("Meet-Point" reference is the girdle row of facets.)

We grind the table first to prepare a surface for using a flat dop. After dopping, the girdle is ground in order to shape the stone. It is faceted with accuracy, as the girdle that will be used as our "reference row" for meet-point faceting. Since the pavilion is so important, it is ground next, beginning with the main facets. The overall length of the pavilion determines how much of the material is left for the crown. If insufficient material is left, the pavilion is re-ground, maintaining the correct main pavilion angles at all costs. When properly shaped, the pavilion is polished, beginning at the culet (or base row of facets) and proceeding toward the girdle facets. *(Polishing the girdle facets is optional.)*

After transferring the gem, the main crown facets are cut, with "meets" being made at the girdle row. After grinding has been completed, the crown is polished, beginning at the star facets (or top row of facets) and proceeding toward the girdle facets.

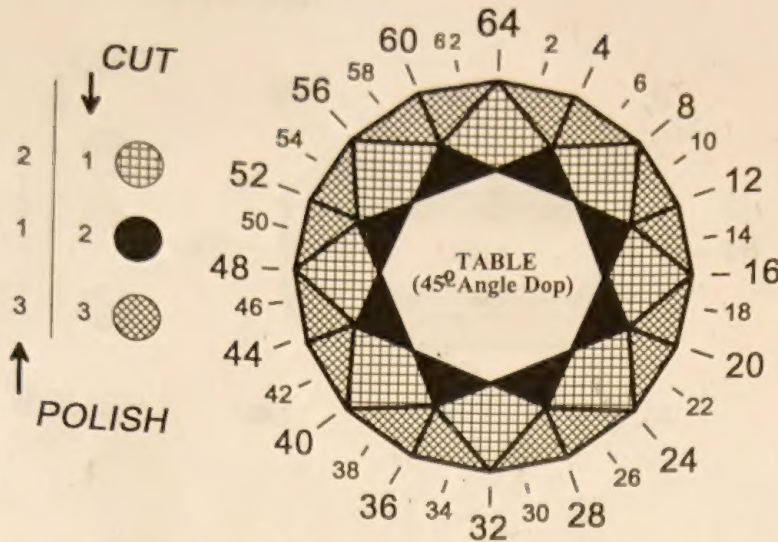
The dop is removed from quill and placed in the 45° dop holder. The table is re-ground (if necessary) to meet star facets at the top of crown. The final step is to polish the table.

In this edition of **The Book of Gem Cuts** the order of cutting has been changed. In all cases, the steps for grinding the girdle are given first, followed by the pavilion, the crown and then the table.

STANDARD BRILLIANT CUT

No. 1

CROWN



64 Index - Angles for Quartz

SHAPE GEM

Grind girdle 90° indexing sixteen facets at 2-6-10-14-18-22-26-30-34-38-42-46-50-54-58-62.

ORDER OF CUTTING - Pavilion

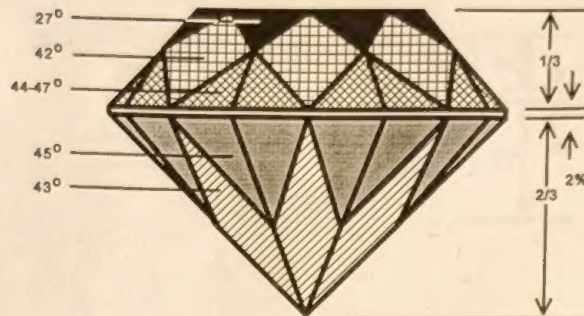
GRIND 1st: Eight facets at 43° indexing 64-8-16-24-32-40-48-56.

GRIND 2nd: Sixteen facets at 45° indexing 2-6-10-etc.

ORDER OF POLISHING - Pavilion

See polishing order on left, using same angles and indices as with grinding.

SIDE VIEW



ORDER OF CUTTING - Crown

GRIND 1st: Eight facets at 42° indexing 64-8-16-24-32-40-48-56.

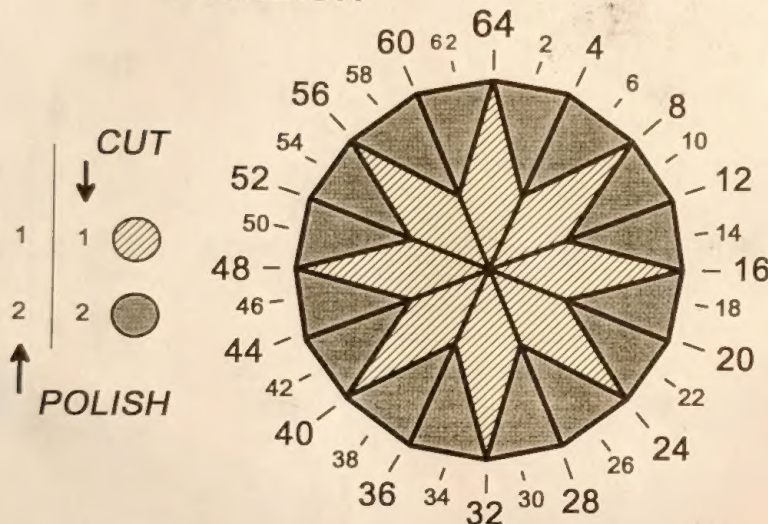
GRIND 2nd: Eight facets at 27° indexing 4-12-20-28-36-44-52-60.

GRIND 3rd: Sixteen facets at 44° to 47° indexing 2-6-10-etc.

ORDER OF POLISHING - Crown

See polishing order on left, using same angles and indices as with grinding.

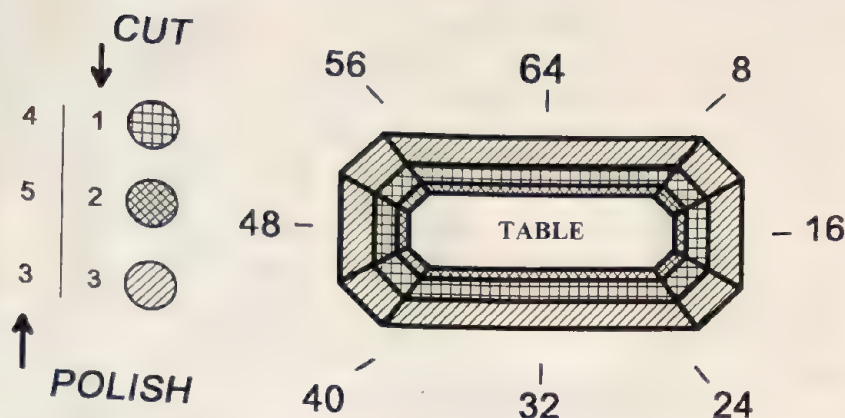
PAVILION



TABLE

Grind and polish table in 45° dop holder. Table to be approximately 40% of girdle width after faceting crown.

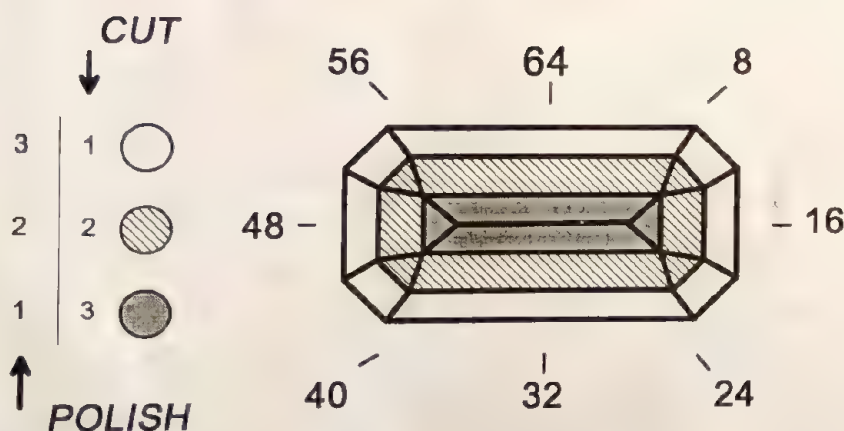
CROWN



SIDE VIEW



PAVILION



64 Index - Angles for Quartz

SHAPE GEM

Grind girdle 90° indexing eight facets at 64-32, 16-48, 8-24-40-56

ORDER OF CUTTING - Pavilion

GRIND 1st: Eight facets at 63° indexing 64-16-48-32 and 8-56-24-40. Make very "small" trial cuts, until the facets are parallel to the crown girdle cuts, and meet to form an even girdle.*

GRIND 2nd: Eight facets at 53° indexing 64-16-48-etc.

GRIND 3rd: Eight facets at 43° indexing 64-16-48-etc.

ORDER OF POLISHING - Pavilion

See polishing order on left, using same angles and indices as with grinding.

ORDER OF CUTTING - Crown

GRIND 1st: Eight facets at 42° indexing 64-16-48- 32 and 8-24-40-56.

GRIND 2nd: Eight facets at 27° indexing 64-16-48-etc.

GRIND 3rd: Eight facets at 55° indexing 64-16-48-etc.

ORDER OF POLISHING - Crown

See polishing order on left, using same angles and indices as with grinding.

TABLE

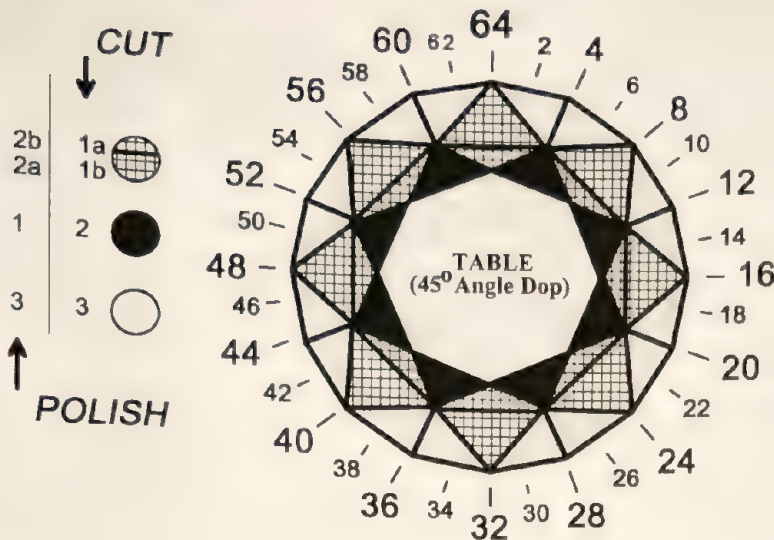
Cut and polish table in 45° dop holder. Table to be approximately 40% of girdle width after faceting crown.

* **SPECIAL NOTES:** In the Emerald cut, difficulty is often encountered in getting pavilion facets to parallel crown facets at the girdle, after stone has been transferred. Difficulties may be overcome by using the compound angle adjuster (cheater) to compensate for mis-alignment.

STANDARD BRILLIANT CUT HORIZONTAL SPLITS

No. 3

CROWN



64 Index - Angles for Quartz

SHAPE GEM

Grind girdle 90° indexing sixteen facets at 2-6-10-14-18-22-26-30-34-38-42-46-50-54-58-62.

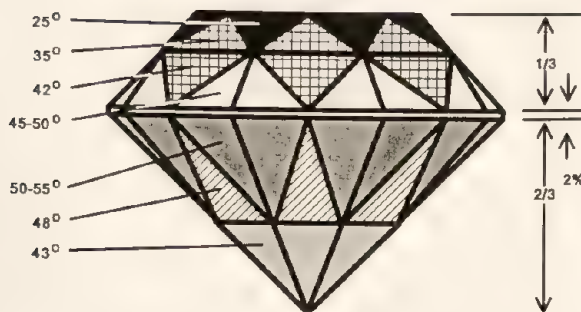
ORDER OF CUTTING - Pavilion

GRIND 1st: Eight facets at 48° indexing 64-8-16-24-32-40-48-56.
GRIND 2nd: Eight facets at 43° indexing 64-8-16-etc.
GRIND 3rd: Sixteen facets at 50° to 55° indexing 2-6-10-etc. Correct angle if necessary, until facet meets the vertical line between 43° facets and the girdle.

ORDER OF POLISHING - Pavilion

See polishing order on left, using same angles and indices as with grinding.

SIDE VIEW



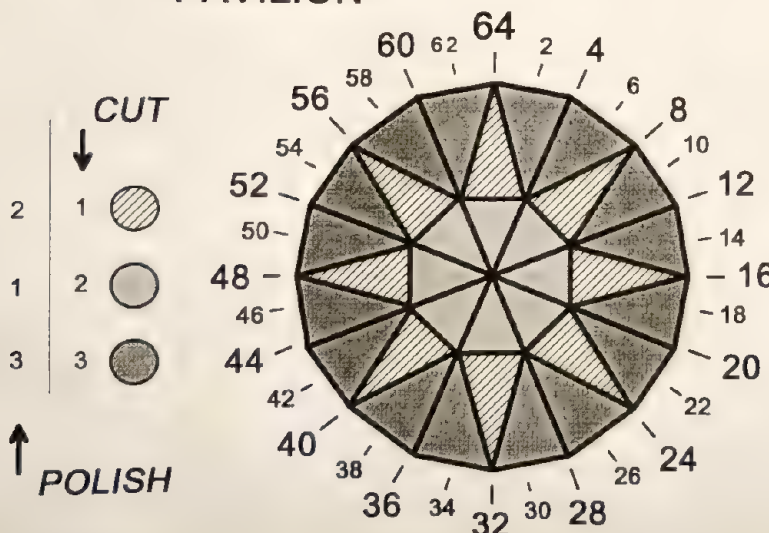
ORDER OF CUTTING - Crown

GRIND 1st:
(B) Eight facets at 42° indexing 64-8-16-24-32-40-48-56.
(A) Eight facets at 35° indexing 64-8-16-etc. Break facets should be about 1/3 length of main facets.
GRIND 2nd: Eight facets at 25° indexing 4-12-20-28-36-44-52-60.
GRIND 3rd: Sixteen facets at 45° to 50° indexing 2-6-10-etc.

ORDER OF POLISHING - Crown

See polishing order on left, using same angles and indices as with grinding.

PAVILION

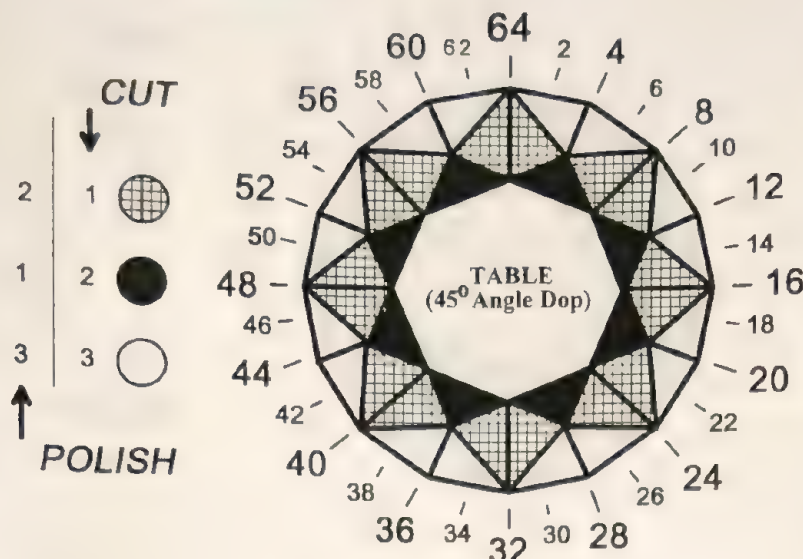


TABLE

Cut and polish table in 45° dop holder. Table to be approximately 40% of girdle width after faceting crown.

STANDARD BRILLIANT CUT VERTICAL SPLITS

CROWN



64 Index - Angles for Quartz

SHAPE GEM

Grind girdle 90° indexing sixteen facets at 2-6-10-14-18-22-26-30-34-38-42-46-50-54-58-62.

ORDER OF CUTTING - Pavilion

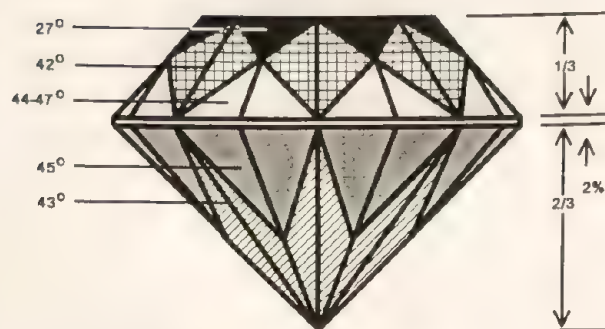
GRIND 1st: Sixteen facets at 43° indexing 63-1, 7-9, 15-17, 23-25, 31-33, 39-41, 47-49, 5-57.

GRIND 2nd: Sixteen facets at 45° indexing 2-6-10-etc.

ORDER OF POLISHING - Pavilion

See polishing order on left, using same angles and indices as with grinding.

SIDE VIEW



ORDER OF CUTTING - Crown

GRIND 1st: Eight facets at 42° indexing 64-8-16-24-32-40-48-56. Regrind these facets still keeping the 42°, but indexing 63-1, 7-9, 15-17, 23-25, 31-33, 39-41, 47-49, 55-57 to get vertical split mains.

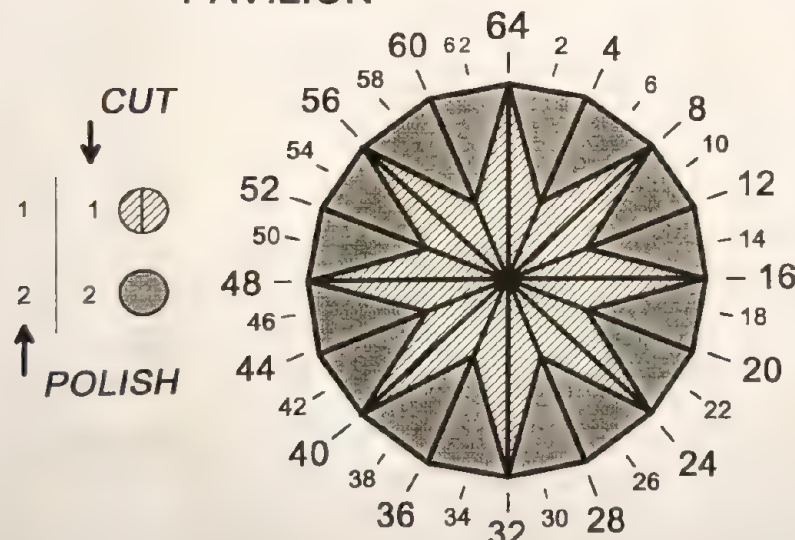
GRIND 2nd: Eight facets at 27° indexing 4-12-20-28-36-44-52-60.

GRIND 3rd: Sixteen facets at 44° to 47° indexing 2-6-10-etc.

ORDER OF POLISHING - Crown

See polishing order on left, using same angles and indices as with grinding.

PAVILION



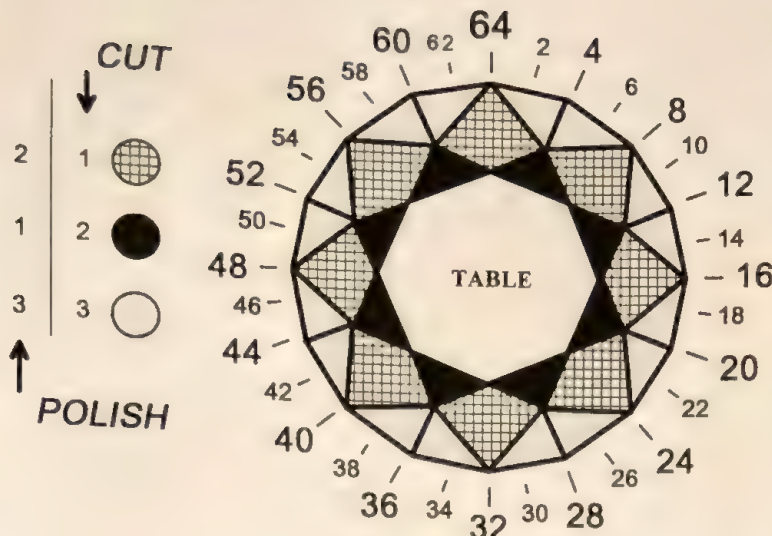
TABLE

Cut and polish table in 45° dop holder. Table to be approximately 40% of girdle width after faceting crown.

ZIRCON CUT

No. 5

CROWN



64 Index - Angles for Quartz

SHAPE GEM

Grind girdle 90° indexing sixteen facets at 2-6-10-14-18-22-26-30-34-38-42-46-50-54-58-62.

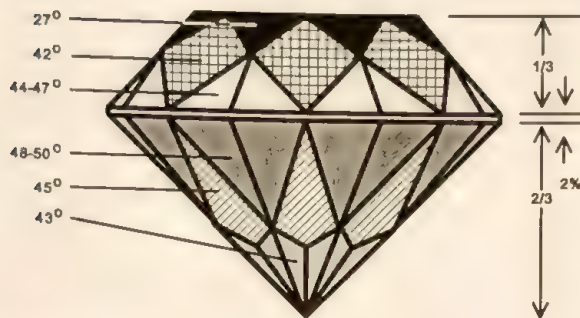
ORDER OF CUTTING - Pavilion

GRIND 1st: Eight facets at 45° indexing 64-8-16-etc.

GRIND 2nd: Sixteen facets at 43° indexing 63-1, 7-9, 15-17, 23-25, 31-33, 39-41, 47-49, 55-57. (Option: culet facets may be cut at same indexing as girdle facets.)

GRIND 3rd: Sixteen facets at 48° to 50° indexing 2-6-10-etc.

SIDE VIEW



ORDER OF POLISHING - Pavilion

See polishing order on left, using same angles and indices as with grinding.

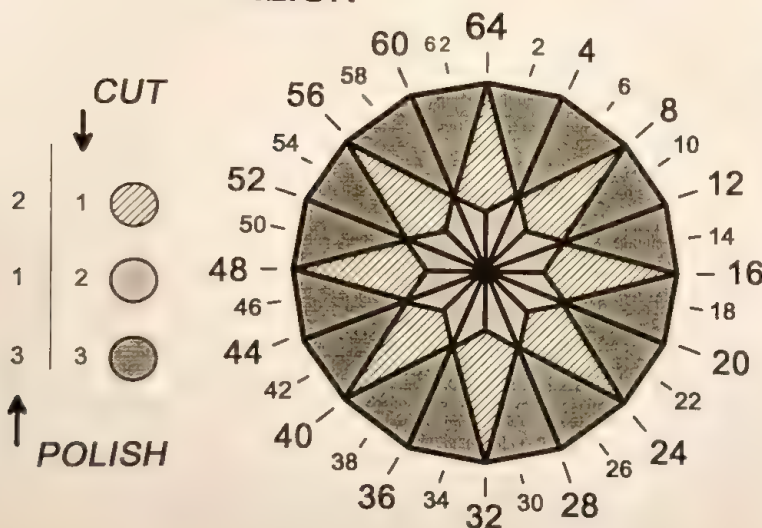
ORDER OF CUTTING - Crown

GRIND 1st: Eight facets at 42° indexing 64-8-16-24-32-40-48-56.

GRIND 2nd: Eight facets at 27° indexing 4-12-20-28-36-44-52-60.

GRIND 3rd: Sixteen facets at 44° to 47° indexing 2-6-10-etc.

PAVILION



ORDER OF POLISHING - Crown

See polishing order on left, using same angles and indices as with grinding.

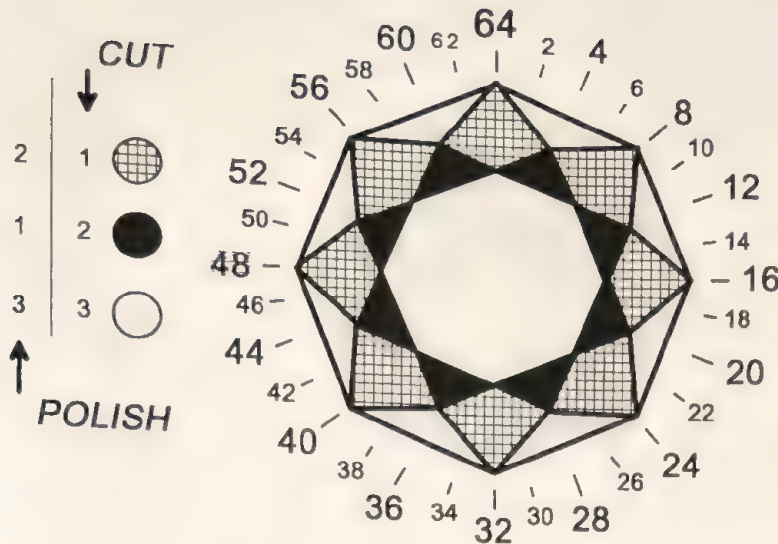
TABLE

Cut and polish table in 45° dop holder. Table to be approximately 40% of girdle width after faceting crown.

MODIFIED BRILLIANT CUT

No. 6

CROWN



64 Index - Angles for Quartz

SHAPE GEM

Grind girdle 90° indexing at eight facets at 4-12-20-28-36-44-52-60.

ORDER OF CUTTING - Pavilion

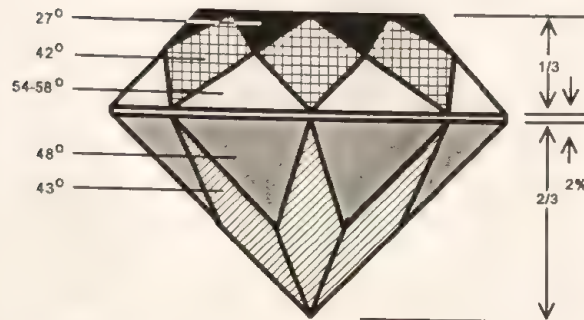
GRIND 1st: Eight facets at 43° indexing 64-8-16-etc.

GRIND 2nd: Eight facets at 48° indexing 4-12-20-etc.

ORDER OF POLISHING - Pavilion

See polishing order on left, using same angles and indices as with grinding.

SIDE VIEW



ORDER OF CUTTING - Crown

GRIND 1st: Eight facets at 42° indexing 64-8-16-24-32-40-48-56.

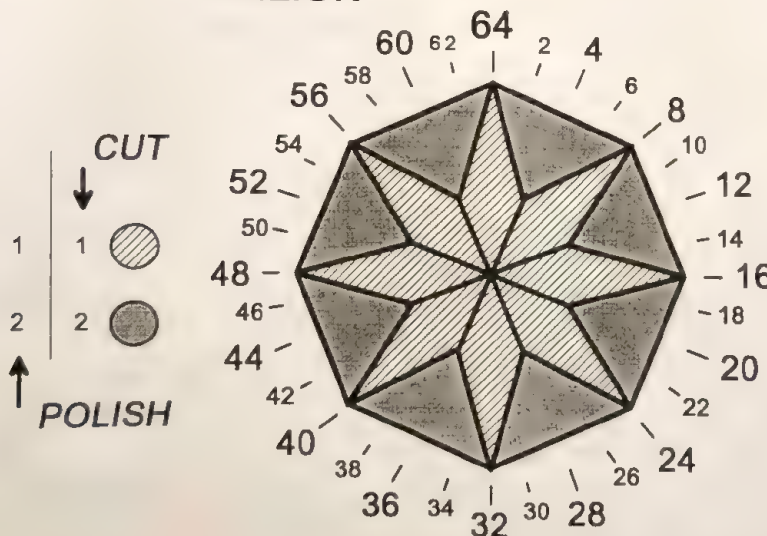
GRIND 2nd: Eight facets at 27° indexing 4-12-20-28-36-44-52-60.

GRIND 3rd: Eight facets at 54° to 58° indexing 4-12-20-etc.

ORDER OF POLISHING - Crown

See polishing order on left, using same angles and indices as with grinding.

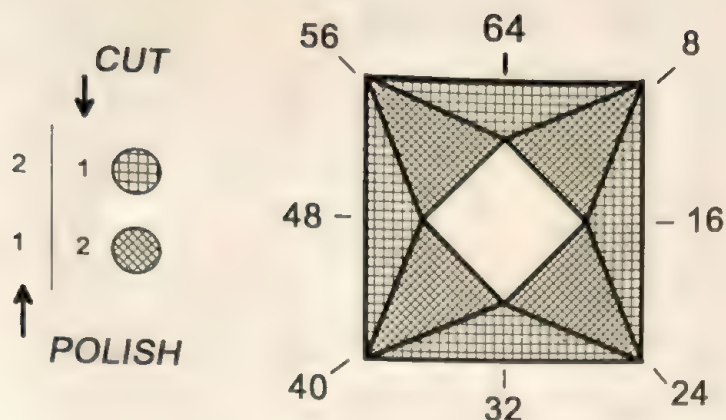
PAVILION



TABLE

Cut and polish table in 45° dop holder. Table to be approximately 40% of girdle width after faceting crown.

CROWN



64 Index - Angles for Quartz

SHAPE GEM

Grind girdle 90° indexing four facets at 64-16-32-48.

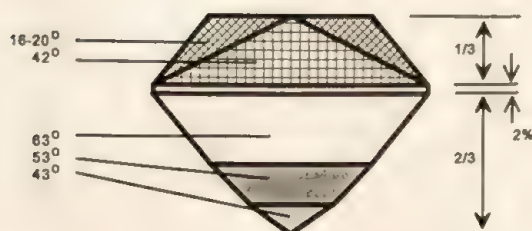
ORDER OF CUTTING - Pavilion

GRIND 1st: Four facets at 63° indexing 64-16-32-48.

GRIND 2nd: Four facets at 53° indexing 64-16-32-48.

GRIND 3rd: Four facets at 43° indexing 64-16-32-48.

SIDE VIEW



ORDER OF POLISHING - Pavilion

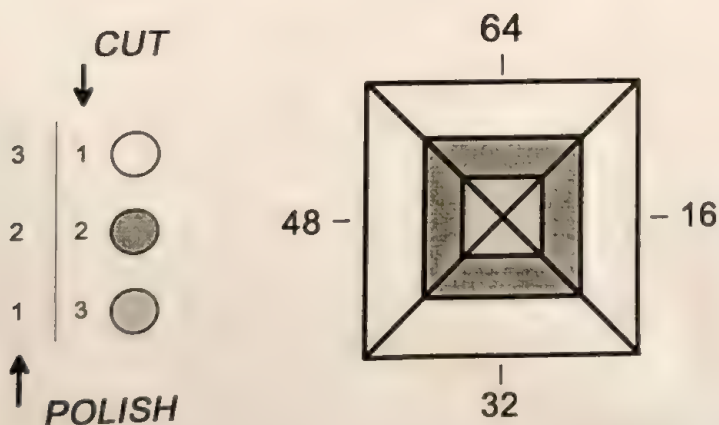
See polishing order on left, using same angles and indices as with grinding.

ORDER OF CUTTING - Crown

GRIND 1st: Four facets at 42° indexing 64-16-32-48.

GRIND 2nd: Four facets at 16° indexing 8-24-40-56.

PAVILION



ORDER OF POLISHING - Crown

See polishing order on left, using same angles and indices as with grinding.

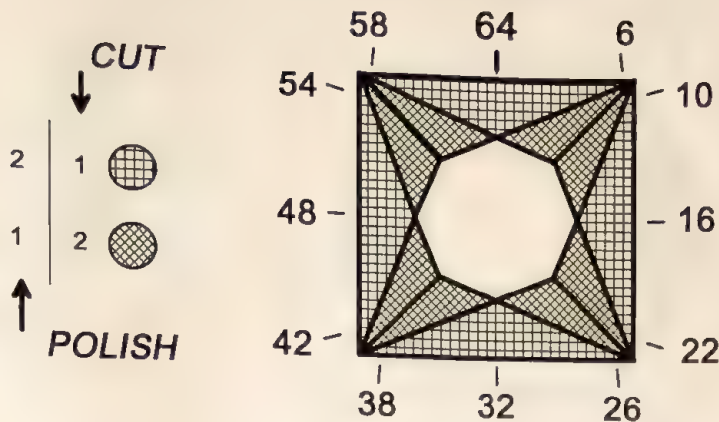
TABLE

Cut and polish table in 45° dop holder. Table to be approximately 40% of girdle width after faceting crown.

DOUBLE STAR CUT

No. 8

CROWN



64 Index - Angles for Quartz

SHAPE GEM

Grind girdle at 90° indexing four facets at 64-16-32-48.

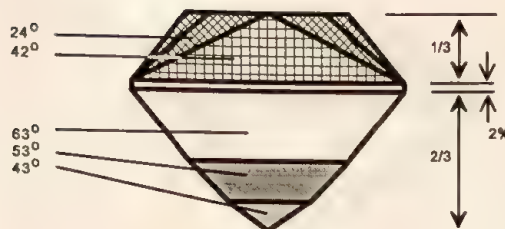
ORDER OF CUTTING - Pavilion

GRIND 1st: Four facets at 63° indexing 64-16-32-48.

GRIND 2nd: Four facets at 53° indexing 64-16-32-48.

GRIND 3rd: Four facets at 43° indexing 64-16-32-48.

SIDE VIEW



ORDER OF POLISHING - Pavilion

See polishing order on left, using same angles and indices as with grinding.

ORDER OF CUTTING - Crown

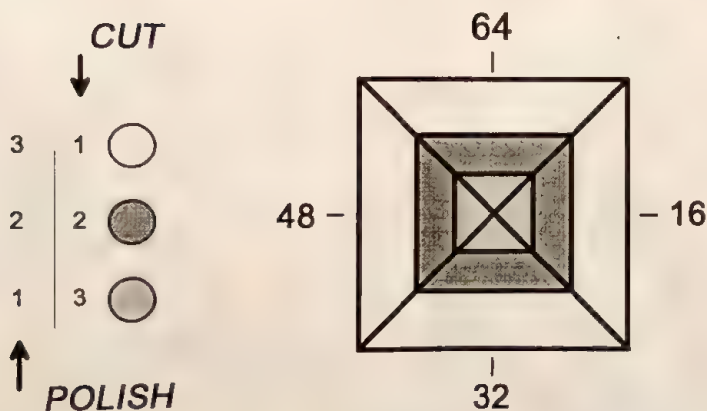
GRIND 1st: Four facets at 42° indexing 64-16-32-48.

GRIND 2nd: Four facets at 24° indexing 6-10, 22-26, 38-42, 54-58.

ORDER OF POLISHING - Crown

See polishing order on left, using same angles and indices as with grinding.

PAVILION



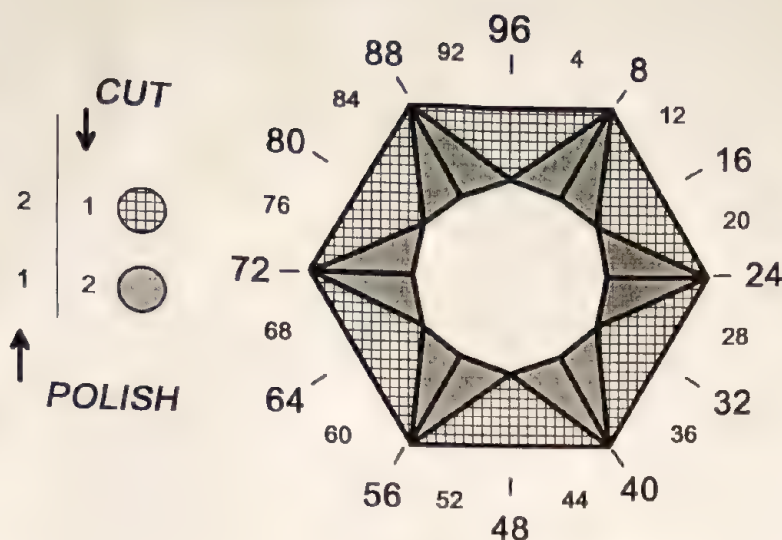
TABLE

Cut and polish table in 45° dop holder. Table to be approximately 40% of girdle width after faceting crown.

MITCHELL SIX-RAY STAR CUT

No. 9

CROWN



96 Index - Angles for Quartz

SHAPE GEM

Grind girdle 90° indexing six facets at 96-16-32-48-64-80.

ORDER OF CUTTING - Pavilion

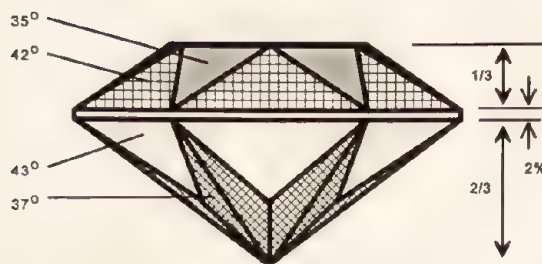
GRIND 1st: Six facets at 43° indexing 96-16-32-48-64-80.

GRIND 2nd: Twelve facets at 37° indexing 4-12-20-etc.

ORDER OF POLISHING - Pavilion

See polishing order on left, using same angles and indices as with grinding.

SIDE VIEW



ORDER OF CUTTING - Crown

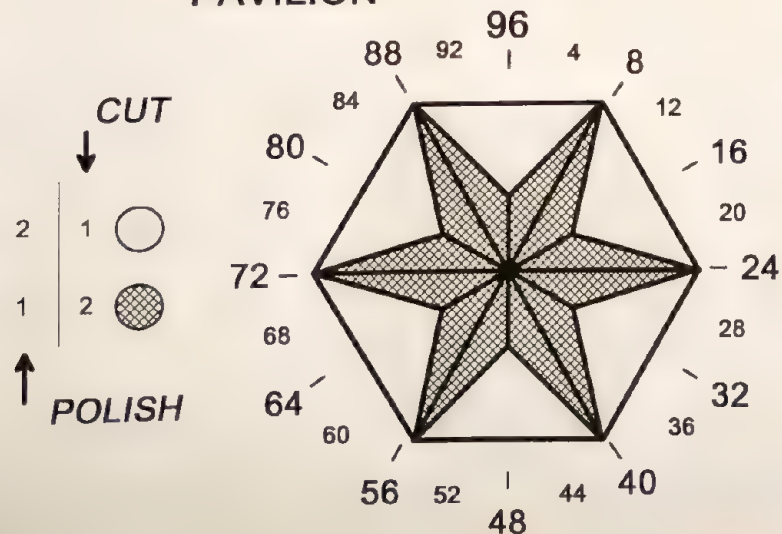
GRIND 1st: Six facets at 42° indexing 96-16-32-48-64-80.

GRIND 2nd: Twelve facets at 35° indexing 4-12, 20-28, 36-44, 52-60, 68-76, 84-92.

ORDER OF POLISHING - Crown

See polishing order on left, using same angles and indices as with grinding.

PAVILION



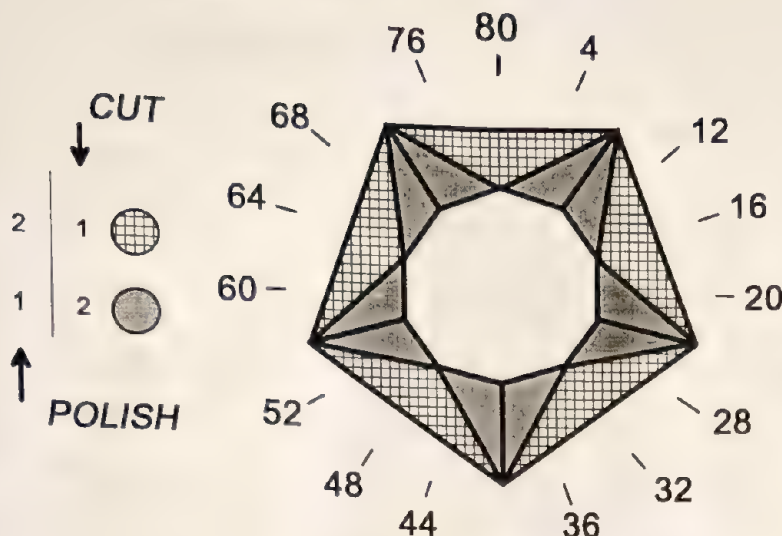
TABLE

Cut and polish table in 45° angle holder. Table to be approximately 40% of the girdle width after faceting crown.

MITCHELL FIVE-RAY STAR CUT

No. 10

CROWN



80 Index - Angles for Quartz

SHAPE GEM

Grind girdle 90° indexing five facets at 80-16-32-48-64.

ORDER OF CUTTING - Pavilion

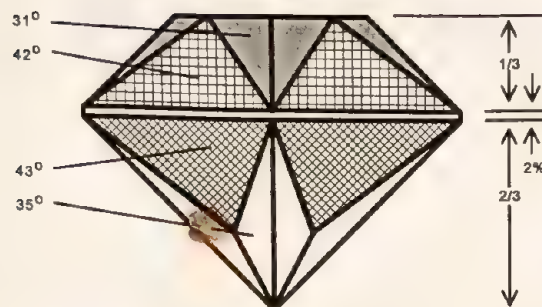
GRIND 1st: Five facets at 43° indexing 80-16-32-48-64.

GRIND 2nd: Ten facets at 35° indexing 4-12, 20-28, 36-44, 52-60, 68-76.

ORDER OF POLISHING - Pavilion

See polishing order on left, using same angles and indices as with grinding.

SIDE VIEW



ORDER OF CUTTING - Crown

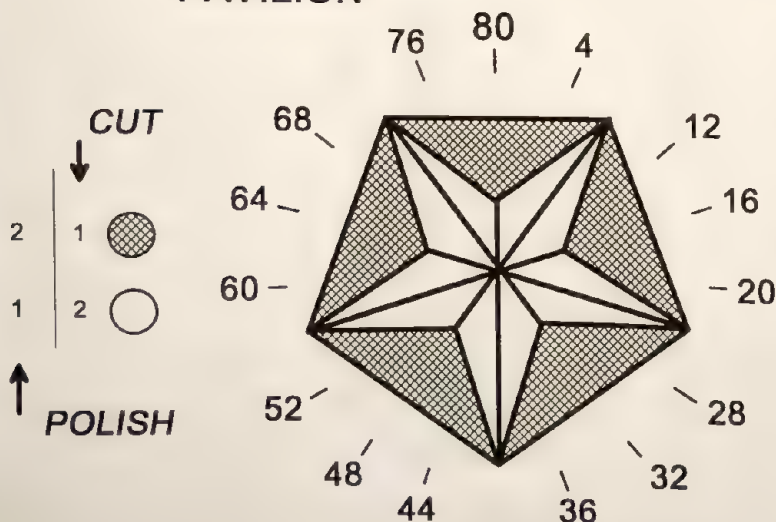
GRIND 1st: Five facets at 42° indexing 80-16-32-48-64.

GRIND 2nd: Ten facets at 31° indexing 4-12, 20-28, 36-44, 52-60, 68-76.

ORDER OF POLISHING - Crown

See polishing order on left, using same angles and indices as with grinding.

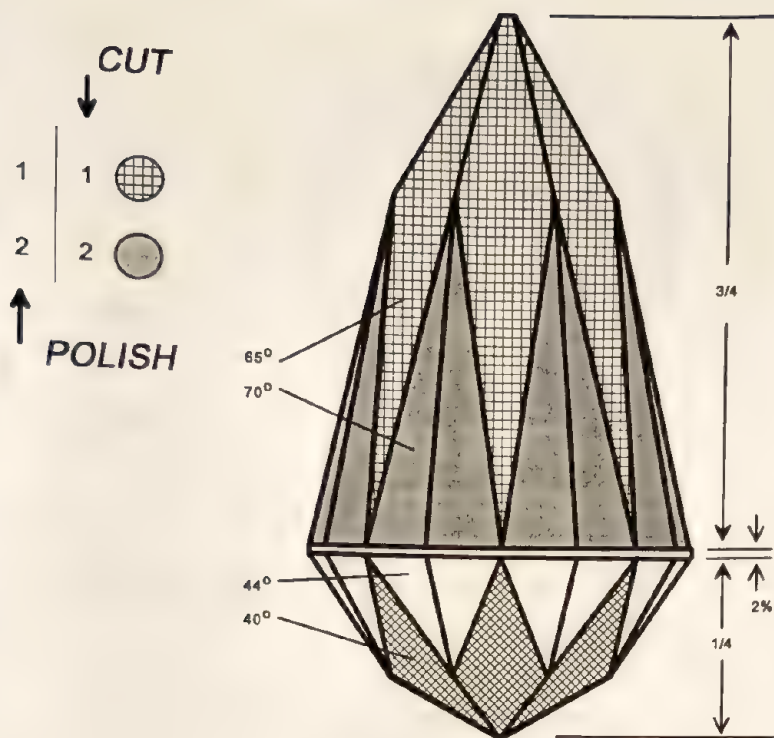
PAVILION



TABLE

Cut and polish table in 45° angle dop holder. Table to be approximately 40% of the girdle width after faceting crown.

SIDE VIEW



64 Index - Angles for Quartz

SHAPE GEM

Grind girdle 90° indexing sixteen facets at 2-6-10-14-18-22-26-30-34-38-42-46-50-54-58-62. Polish girdle after completing crown and pavilion cuts.

ORDER OF CUTTING - Top

GRIND 1st: Eight facets 65° indexing 64-8-16-24-32-40-48-56.

GRIND 2nd: Sixteen facets at 70° indexing 2-6-10-etc.

Top point can be ground flat in 45° dop holder to permit drilling, but be careful.

ORDER OF POLISHING - Top

See polishing order on left, using same angles and indices as with grinding.

ORDER OF CUTTING - Bottom

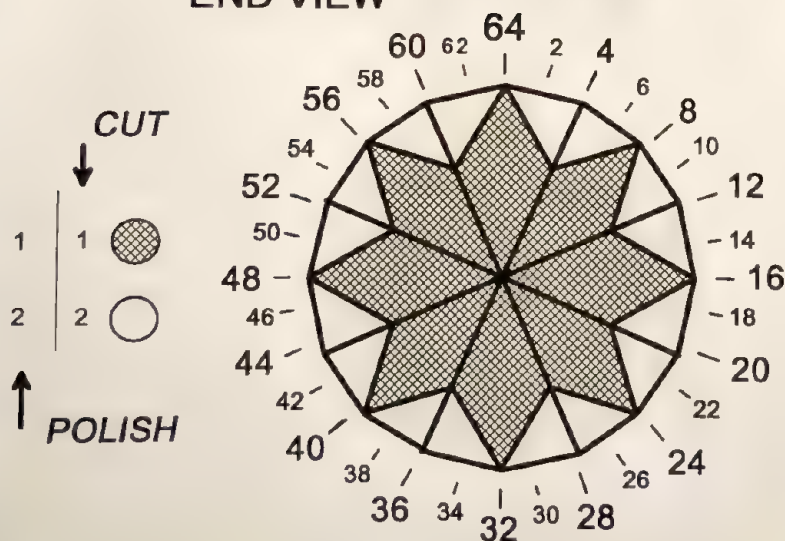
GRIND 1st: Eight facets at 40° indexing 64-8-16-etc.

GRIND 2nd: Sixteen facets at 44° indexing 2-6-10-etc.

ORDER OF POLISHING - Bottom

See polishing order on left, using same angles and indices as with grinding.

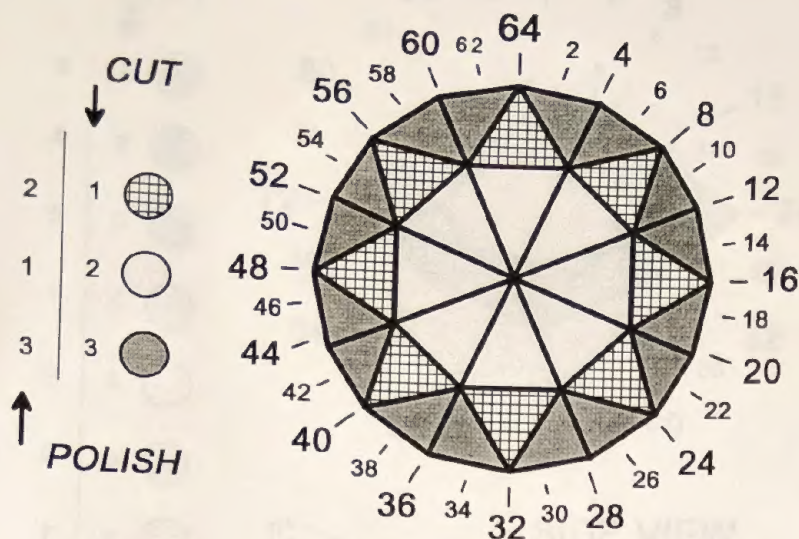
END VIEW



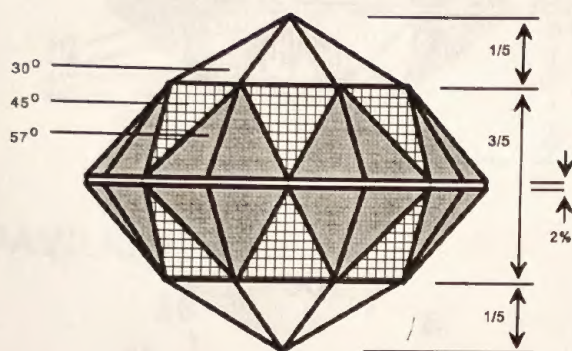
DOUBLE ROSE CUT

No. 12

TOP & BOTTOM



SIDE VIEW



64 Index - Angles for Quartz

SHAPE GEM

Grind girdle 90° indexing sixteen facets at 2-6-10-14-18-22-26-30-34-38-42-46-50-54-58-62.

ORDER OF CUTTING - Top & Bottom

GRIND 1st: Eight facets at 45° indexing 64-8-16-24-32-40-48-56. (Not necessary for these facets to extend more than 40% of the distance from the girdle line to the point.)

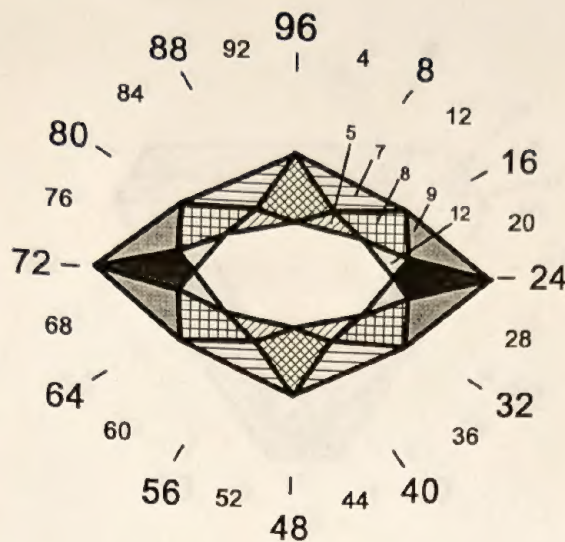
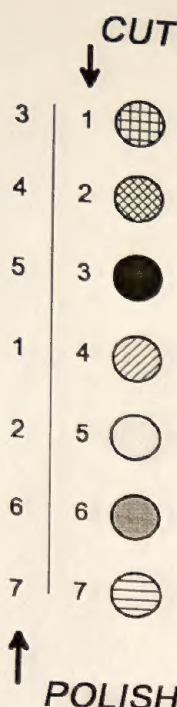
GRIND 2nd: Eight facets at 30° indexing 64-8-16-24-32-40-48-56.

GRIND 3rd: Sixteen facets at 57° indexing 2-6-10-14-18-22-26-30-34-38-42-46-50-54-58-62.

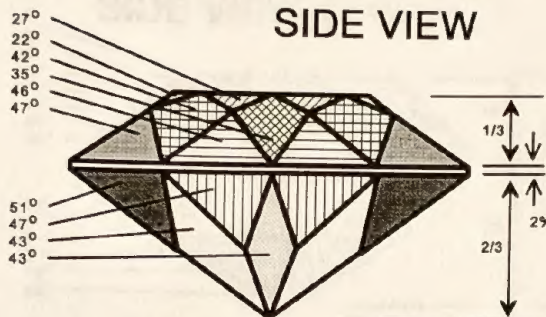
ORDER OF POLISHING

See polishing order on left, using same angles and indices as with grinding.

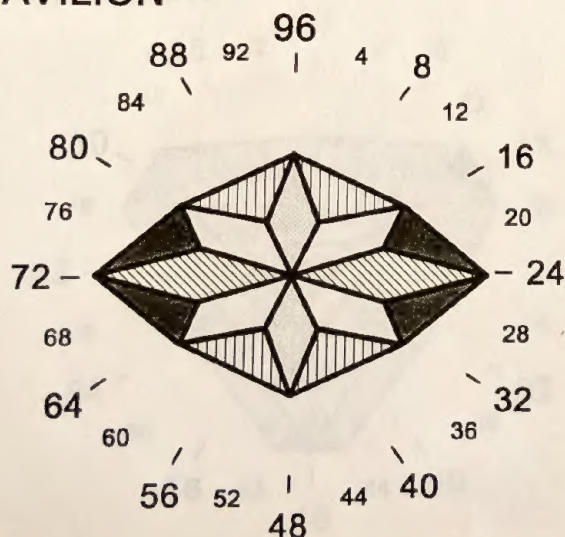
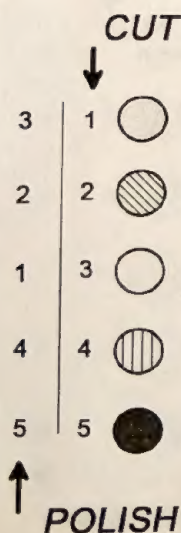
CROWN



SIDE VIEW



PAVILION



96 Index - Angles for Quartz

SHAPE GEM

Grind girdle 90° indexing four facets at 8-88, 40-56. Then split to eight facets at 7-9, 87-89, 39-41, 55-57 (Depending on length to width ratio, may be necessary to adjust facets after grinding pavilion facets.)

ORDER OF CUTTING - Pavilion

GRIND 1st: Two facets at 43° indexing 96-48.

GRIND 2nd: Two facets at 31° indexing 24-72.

GRIND 3rd: Four facets at 43° indexing 8-40-56-88.

GRIND 4th: Four facets at 47° indexing 7-41-55-89.

GRIND 5th: Four facets at 51° indexing 9-39-57-87.

ORDER OF POLISHING - Pavilion

See left. Same settings as with grinding.

ORDER OF CUTTING - Crown

GRIND 1st: Four facets at 42° indexing 8-40-56-88.

GRIND 2nd: Two facets at 35° indexing 96-48.

GRIND 3rd: Two facets at 20° indexing 24-72.

GRIND 4th: Four facets at 27° indexing 5-43-53-91.

GRIND 5th: Four facets at 22° indexing 12-36-60-84.

GRIND 6th: Four facets at 47° indexing 9-39-57-87.

GRIND 7th: Four facets at 46° indexing 7-41-55-89.

ORDER OF POLISHING - Crown

See left. Same settings as with grinding.

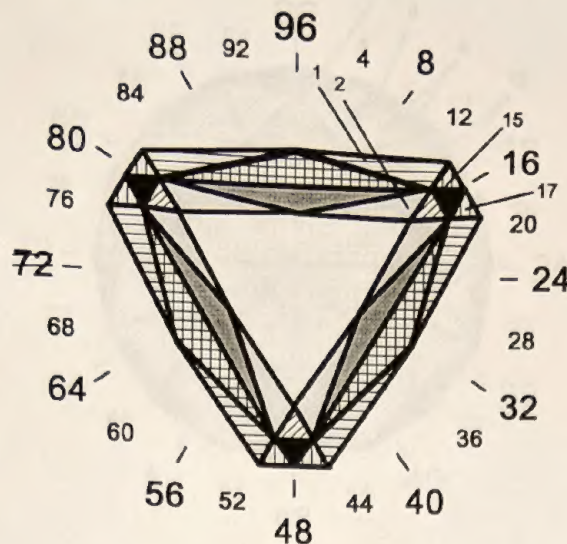
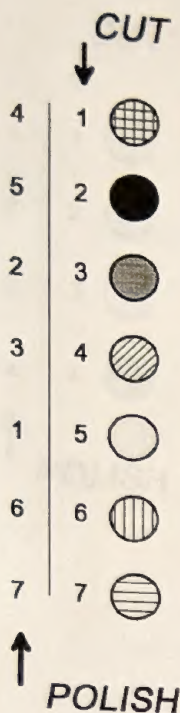
TABLE

Cut and polish table in 45° angle dop approximately 40% of the width of the stone at the girdle.

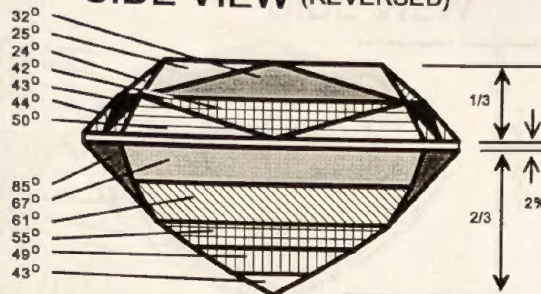
TRIANGULAR MIXED CUT

No. 14

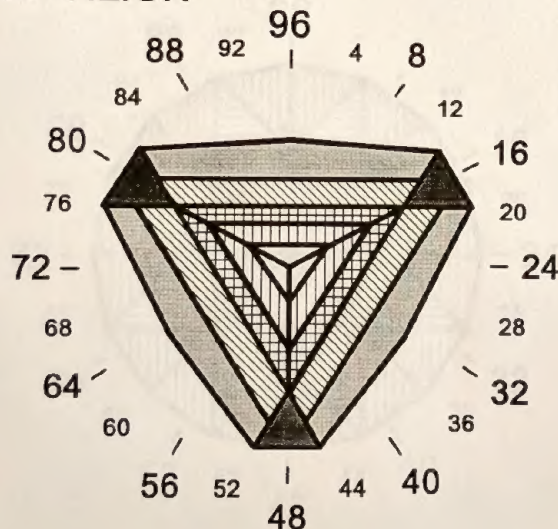
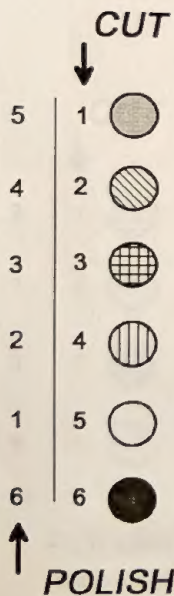
CROWN



SIDE VIEW (REVERSED)



PAVILION



96 Index - Angles for Quartz

SHAPE GEM

Grind girdle 90° indexing six facets at 96-32-64 & 16-48-80. Then split facets: 1-95, 31-33, 63-65 & 15-17, 47-49, 79-81.

ORDER OF CUTTING - Pavilion

GRIND 1st: Three facets at 67° indexing 96-32-64.

GRIND 2nd: Three facets at 61° indexing 96-32-64.

GRIND 3rd: Three facets at 55° indexing 96-32-64.

GRIND 4th: Three facets at 49° indexing 96-32-64.

GRIND 5th: Three facets at 43° indexing 96-32-64.

GRIND 6th: Three facets at 85° indexing 16-48-80.

ORDER OF POLISHING - Pavilion

See left. Same settings as with grinding.

ORDER OF CUTTING - Crown

GRIND 1st: Three facets at 42° indexing 96-32-64.

GRIND 2nd: Three facets at 43° indexing 16-48-80.

GRIND 3rd: Three facets at 32° indexing 96-32-64.

GRIND 4th: Three facets at 24° indexing 16-48-80.

GRIND 5th: Six facets at 25° indexing 2-30-34-62-66-94.

GRIND 6th: Six facets at 44° indexing 15-17-47-49-79-81.

GRIND 7th: Six facets at 50° indexing 1-31-33-63-65-95.

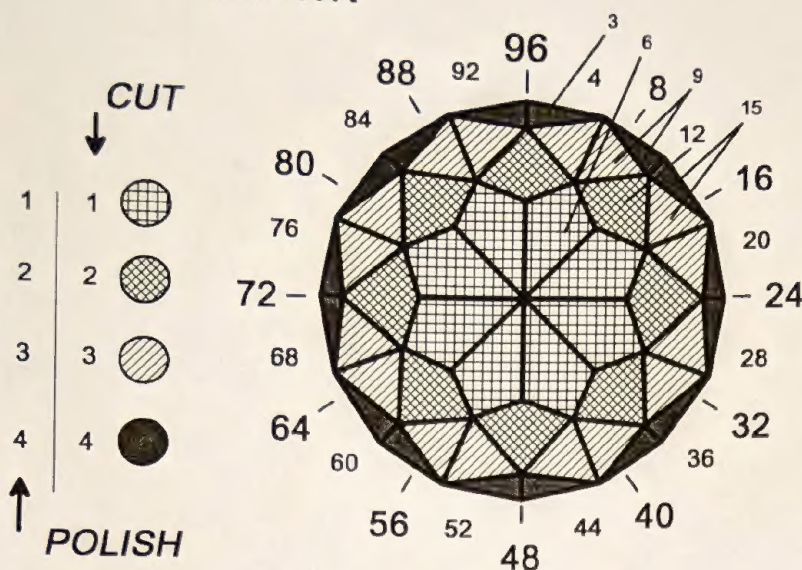
ORDER OF POLISHING - Crown

See left. Same settings as with grinding.

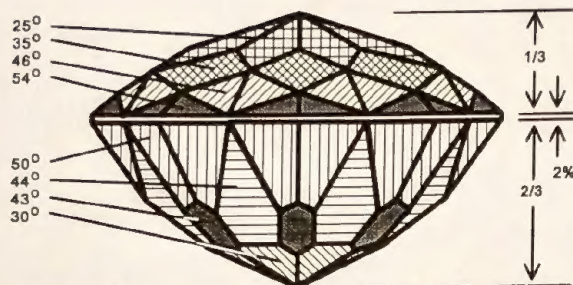
TABLE

Cut and polish table in 45° dop holder. Table to be approximately 40% of girdle width after faceting crown.

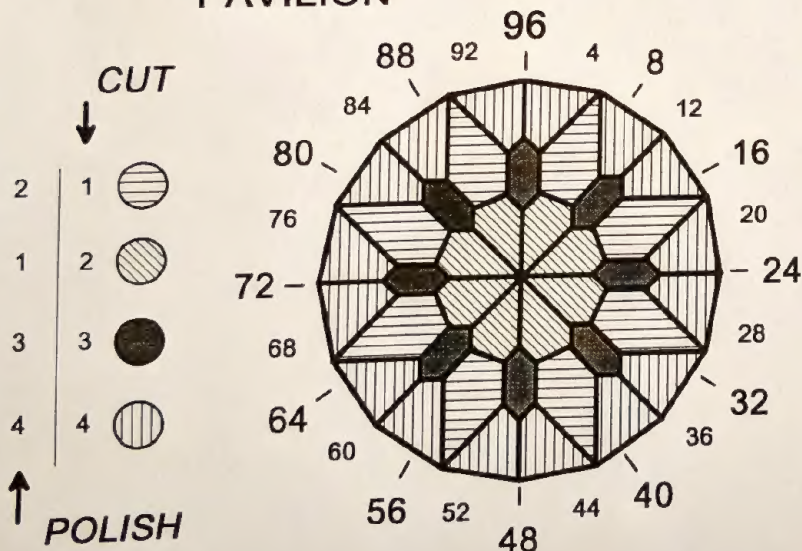
CROWN



SIDE VIEW



PAVILION



96 Index - Angles for Quartz

NOTE: Compounding of the third set of Crown facets is required to make the Jubilee Cut when using a 96 Index Gear.

SHAPE GEM

Grind girdle 90° indexing sixteen facets at 3-9-15-21-27-33-39-45-51-57-63-69-75-81-87-93.

ORDER OF CUTTING - Pavilion

GRIND 1st: Eight facets at 44° indexing 6-18-30-etc..

GRIND 2nd: Eight facets at 30° indexing 6-18-30-etc.

GRIND 3rd: Eight facets at 43° indexing 96-12-24-etc.

GRIND 4th: Sixteen facets at 50° indexing 3-9-15-etc.

ORDER OF POLISHING - Pavilion

See left. Same settings as with grinding.

ORDER OF CUTTING - Crown

GRIND 1st: Eight facets at 25° indexing 6-18-30-42-54-66-78-90.

GRIND 2nd: Eight facets at 35° indexing 96-12-24-36-48-60-72-84.

GRIND 3rd: Sixteen facets at 46° indexing 3-9-15-etc.

Adjust compound angle screws until proper "skew" is obtained by trial cuts. Start index 3 and adjust until 46° facet points up correctly. Proceed to cut EVERY OTHER 46° facet indexing: 3-15-27-39-51-63-75-87. Then adjust skew in the opposite direction on index 9, and cut EVERY OTHER facet indexing: 9-21-33-45-57-69-81-93.

Be sure to re-set cheater to "Zero" after finishing last grind at index 93.

GRIND 4th: Sixteen facets at 54° indexing 3-9-15-etc.

ORDER OF POLISHING - Crown

See left. Same settings as with grinding.